Claims:

1. An optical device comprising:

a slab waveguide;

at least one input waveguide coupled to a first side of the slab waveguide;

a plurality of output waveguides coupled to a second side of the slab waveguide;

wherein said slab waveguide has a segmented transition region that includes a plurality of waveguiding regions spaced apart from one other by at least one discrete sector.

2. The optical device of claim 1 wherein said plurality of waveguiding regions have widths that progressively decrease as they approach said second side of the slab waveguide.

3. The optical device of claim 1 wherein said plurality of waveguiding regions and said plurality of output waveguides each comprise a light-carrying core material whose indices of refraction are substantially equal to one another.

4. The optical device of claim 2 wherein the discrete sectors located between each pair of waveguiding regions have a lower index of refraction than the waveguiding regions

5. The optical device of claim 2 wherein the discrete sectors have widths that progressively increase as they approach said second side of the slab waveguide

6. The optical device of claim 2 wherein the waveguiding regions are substantially parallel to each other.

7. The optical device of claim 6 wherein the waveguiding regions extend in a direction generally perpendicular to the plurality of output waveguides.

8. The optical device of claim 2 wherein said widths of the waveguiding regions progressively decrease in a linear manner.

9. The optical device of claim 2 wherein said widths of the waveguiding regions progressively decrease in a non-linear manner.

10. The optical device of claim 1 wherein the optical device comprises a star coupler having a plurality of input waveguides and a plurality of output waveguides.

11. The optical device of claim 1 wherein the optical device comprises a branch power splitter having a single input waveguide and a plurality of output waveguides.

12. The optical device of claim 1 wherein said input and output waveguides are single mode waveguides.

13. A planar light-guide circuit, comprising:

a substrate;

a slab waveguide located on said substrate;

at least a first waveguide located on said substrate and coupled to a first side of the slab waveguide;

at least a plurality of second waveguides located on said substrate and coupled to a second side of the slab waveguide;

N waveguiding regions, where N is an integer greater than or equal to 2, said waveguiding regions being located within said slab waveguide and being spaced apart from one another by segments of predetermined width.

14. The circuit of claim 13 wherein said waveguiding regions have widths that progressively decrease as they approach said second side of the slab waveguide.

15. The circuit of claim 13 wherein the predetermined widths of said segments have widths that progressively increase as they approach said second side of the slab waveguide.

16. The circuit of claim 14 wherein the predetermined widths of said segments progressively increase as they approach said second side of the slab waveguide.

17. The circuit of claim 13 wherein each of the waveguiding regions and one of the segments adjacent thereto have a combined width that is substantially the same for all N.

18. The circuit of claim 13 wherein said slab waveguide, said N waveguiding regions, and said plurality of second waveguides each comprise a light-carrying core material whose indices of refraction are substantially equal to one another.

19. The circuit of claim 18 wherein said segments of predetermined width have a lower index of refraction than the waveguiding regions.

20. The circuit of claim 13 wherein said first and said plurality of second waveguides are single mode waveguides.

21. An optical device, comprising

a first star coupler having a first waveguide array that is coupled to a first slab waveguide;

a second star coupler having a second waveguide array that is coupled to a second slab waveguide;

N waveguiding regions, where N is an integer greater than or equal to 2, said waveguiding regions being located within said second slab waveguide and being spaced apart from one another by segments of predetermined width;

a grating comprising a plurality of waveguides having unequal optical paths lengths, said grating interconnecting the first and second star couplers.

22. The optical device of claim 21 wherein said waveguiding regions have widths that progressively decrease as they approach said second waveguide array.

23. The optical device of claim 21 wherein the predetermined widths of said segments progressively increase as they approach said second waveguide array.

24. The optical device of claim 22 wherein the predetermined widths of said segments have widths that progressively increase as they approach said second waveguide array.

25. The optical device of claim 21 wherein each of the waveguiding regions and one of the segments adjacent thereto have a combined width that is substantially the same for all N.

26. The optical device of claim 21 wherein said first and second slab waveguides, said N waveguiding regions, and said first and second waveguide arrays each comprise a light-carrying core material whose indices of refraction are substantially equal to one another.

27. The optical device of claim 26 wherein said first and second slab waveguide, said N waveguiding regions, and said first and second waveguide arrays are formed on a common substrate.

28. The optical device of claim 21 wherein said segments of predetermined width have a lower index of refraction than the waveguiding regions.

29. The optical device of claim 21 wherein said first and second waveguide arrays comprise single mode waveguides.